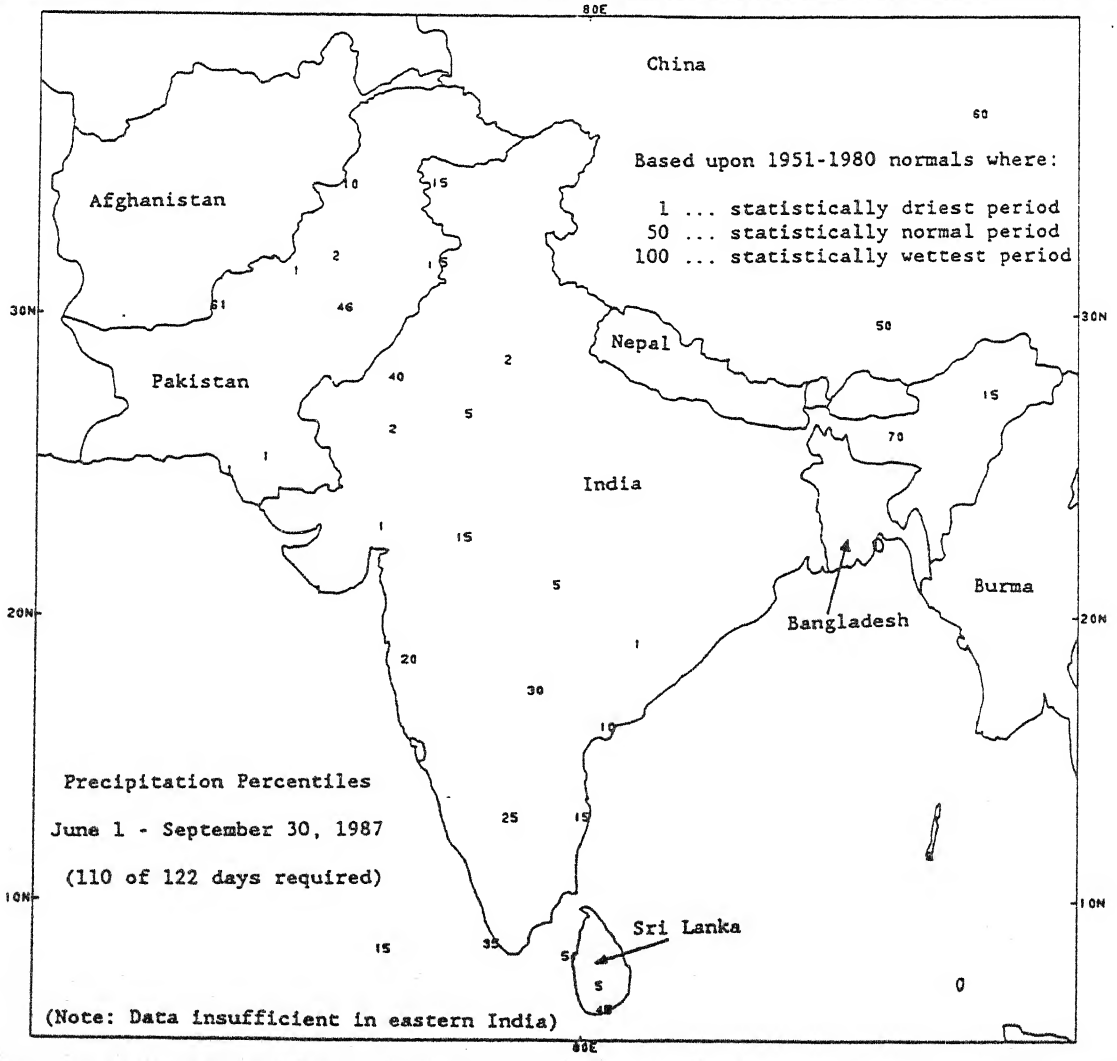
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 88/17 Washington, DC April 23, 1988



CONCERNS FOR A NEAR-NORMAL MONSOON (JUN-SEP) ARE GREAT, ESPECIALLY WITH LAST YEAR'S FAILURE OF THE RAINS. DEPICTED ABOVE ARE THE PRECIPITATION PERCENTILES FROM JUNE 1 - SEPTEMBER 30, 1987. BASED UPON THE 1951-1980 MONTHLY NORMAL RAINFALL, MANY LOCATIONS, MOST NOTABLY IN NORTHWESTERN INDIA AND CENTRAL PAKISTAN, STATISTICALLY RECORDED ONE OF THEIR DRIEST MONSOONS IN RECENT HISTORY. REFER TO THE SPECIAL CLIMATE SUMMARY FOR A BRIEF REVIEW OF LAST YEAR'S MONSOON AND THE NORMAL MONTHLY AMOUNTS.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

Highlights of major global climatic events and anomalies.
U.S. climatic conditions for the previous week.
U.S. apparent temperatures (summer) or wind chill (winter).
Global two-week temperature anomalies.
Global four-week precipitation anomalies.
Global monthly temperature and precipitation anomalies.
Global three-month precipitation anomalies (once a month).
Global twelve-month precipitation anomalies (every 3 months).
Global temperature anomalies for winter and summer seasons.
Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF APRIL 23, 1988
(Approximate duration of anomalies is in brackets.)

1. Western United States:

WIDESPREAD RAINS END DRYNESS.

Up to 75.5 mm (2.97 inches) of rain fell at coastal and interior California stations and provided some relief from dryness in the region [Ending at 13 weeks].

2. Southeastern United States:

MUCH NEEDED RAINS OCCUR.

As much as 119.6 mm (4.71 inches) of rain was reported at stations in the southeastern United States [Ending at 11 weeks].

3. North Central United States:

UNUSUALLY DRY CONDITIONS PREVAIL.

Little or no precipitation was recorded in northern Minnesota, northern South Dakota, and North Dakota where dryness remains [6 weeks].

4. Europe:

CENTRAL EUROPE WETNESS ENDS.

Light precipitation, generally less than 10.7 mm (0.42 inch), was measured across most of Central Europe as unusually wet conditions ended [Ended at 12 weeks].

5. Brazil:

TEMPERATURES REMAIN ABOVE NORMAL.

Temperatures reached up to 4.4°C (7.9°F) above normal across much of west central Brazil [7 weeks].

6. Australia:

DRYNESS PERSISTS IN VICTORIA AND TASMANIA.

Little or no precipitation, 28.0 mm (1.10 inches) or less, was reported in southeastern Australia as the autumn rains have been delayed [6 weeks].

7. Kenya:

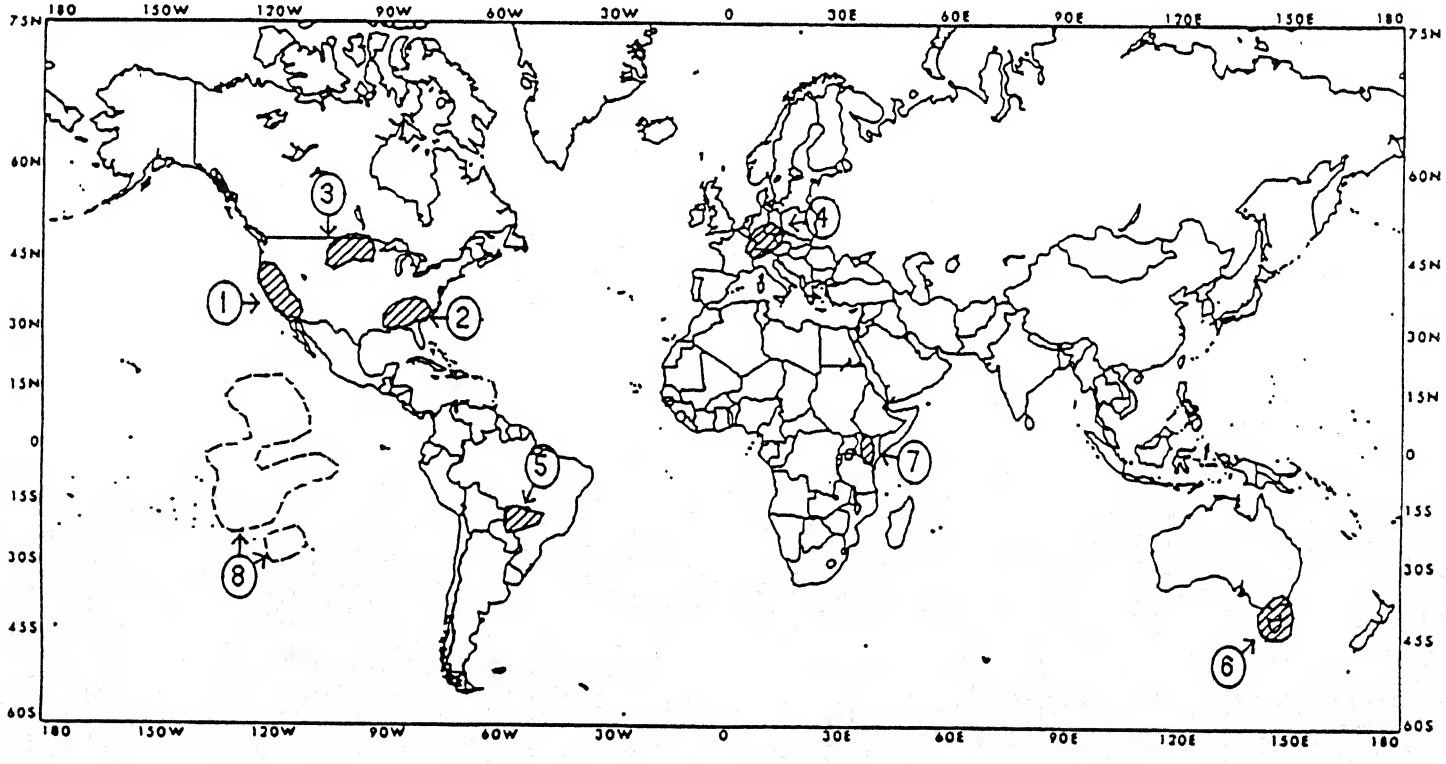
HEAVY RAINS REPORTED.

Heavy precipitation fell in central and western Kenya with amounts up to 262 mm (10.32 inches) recorded at some locations [Episodal Event].

8. Central and Eastern Tropical Pacific:

REFER TO MARCH 1988 EL NINO/SOUTHERN OSCILLATION (ENSO) ADVISORY.

The areas of positive sea surface temperature anomalies above 1°C (1.8°F) have greatly diminished over the past few months. Regions above 1°C (1.8°F) during March 1988 are outlined.



Approximate locations of the major anomalies and events described above are shown on this map. See the other world maps in this Bulletin for current two-week temperature anomalies, four-week precipitation anomalies, and (occasionally) longer-term anomalies.

U.S. WEEKLY WEATHER HIGHLIGHTS

FOR THE WEEK OF APRIL 17 THROUGH APRIL 23, 1988

Much-needed moderate to heavy precipitation fell across most of the unseasonably dry regions of the western and southeastern U.S. and eased short-term moisture deficiencies (see Table 1). In the West, weekly totals were generally more widespread and larger (1-3 inches) in California, Oregon, and the Great Basin states as compared to the previous week's amounts. A large portion of the Southeast, from Arkansas and Mississippi eastwards to the Carolina coasts, received 2-4 inches of rain from strong, sometimes violent, thunderstorms. Elsewhere, scattered, heavy rainfall was reported in western Nebraska, northern Oklahoma and eastern Kansas, parts of lower Michigan, and in the central Appalachians. Light to moderate amounts were received in much of the country west of the Rockies, in the central and southern Great Plains, and throughout the eastern third of the nation. Little or no precipitation occurred in portions of the desert Southwest, New Mexico and southwestern Texas, the western Gulf Coast area, the northern Great Plains and upper Midwest, and in sections of southern Florida.

Below normal temperatures continued in the eastern half of the U.S. last week (see Table 3). Departures of -8 to -11°F were concentrated in the northern Great Plains, upper Midwest, and interior New England. Cooler conditions replaced the previous week's unusually warm weather in California, Nevada, Utah, and Arizona. Slightly above normal temperatures were observed in the Pacific Northwest, the Rockies, southern Texas and Louisiana, and in most of Florida. Unseasonably mild conditions remained in Alaska as departures up to +19°F were recorded in the western half of the state (see Table 2).

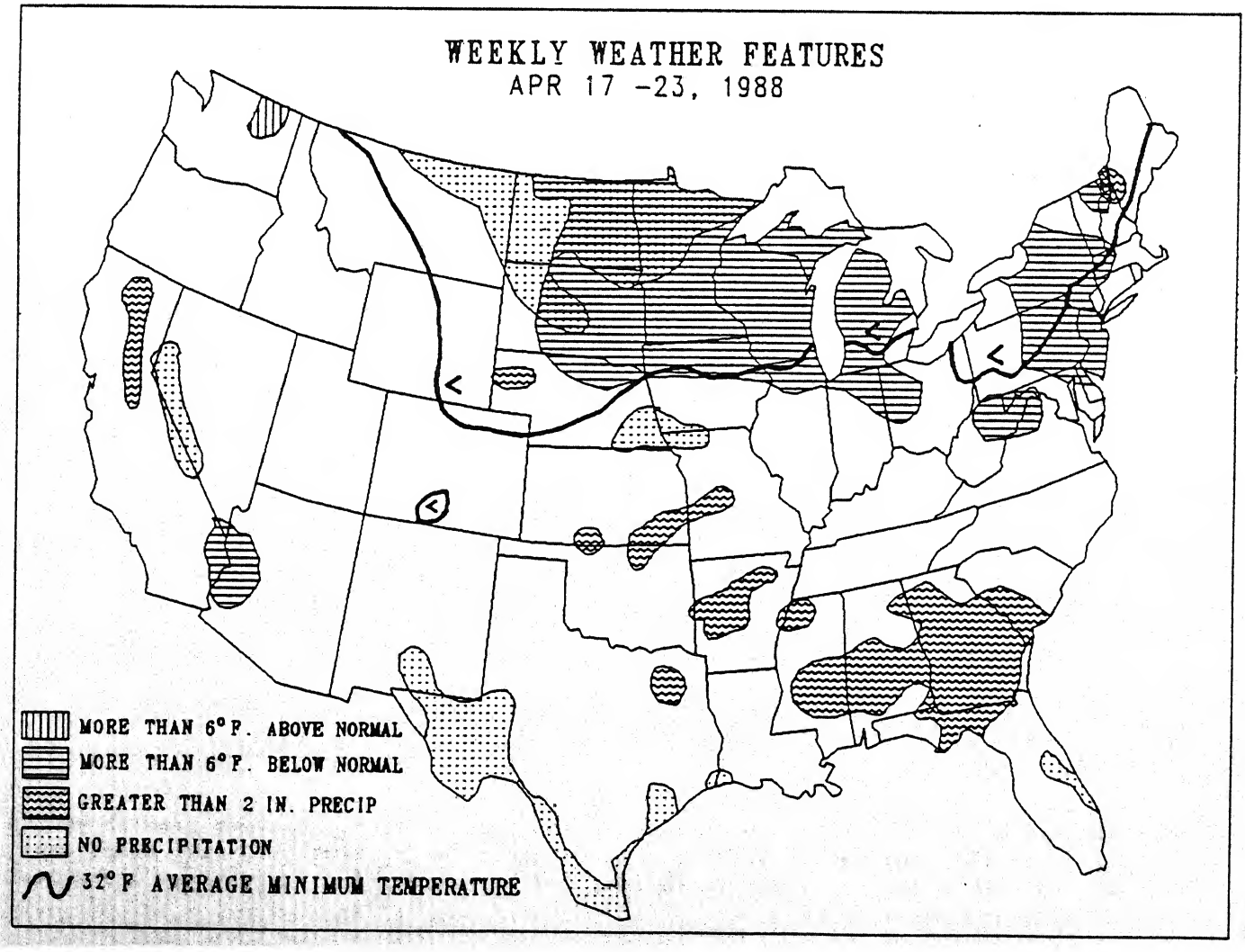


TABLE 1. Selected stations with two or more inches of precipitation for the week.

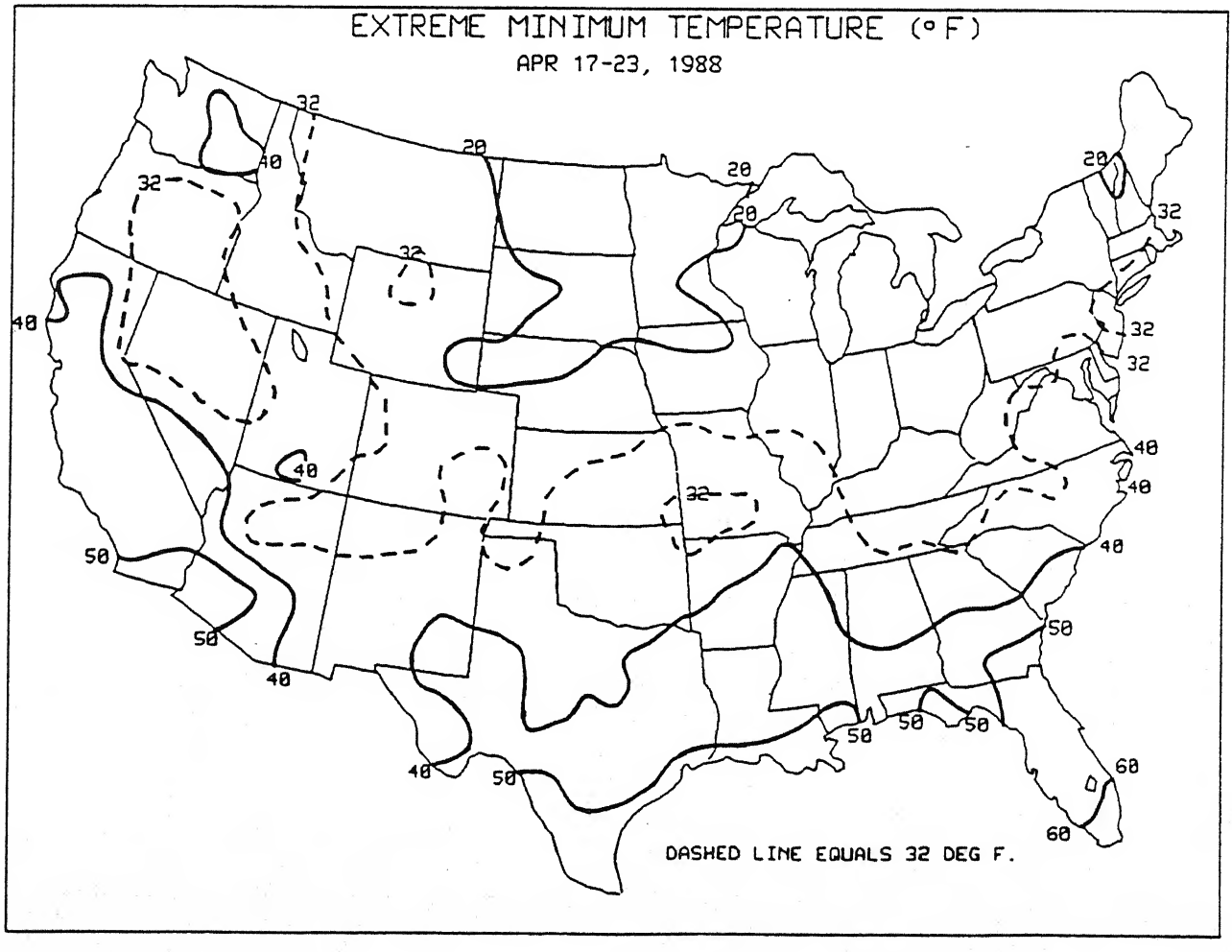
Valdosta/Moody AFB, GA	4.71	Redding, CA	2.59
Mt. Washington, NH	4.55	Columbus/Ft. Benning, GA (LSF)	2.59
Montgomery, AL	3.84	Marysville/Beale AFB, CA	2.56
Meridian, MS (MEI)	3.44	Appalachicola, FL	2.56
Meridian NAS, MS (NMM)	3.20	Chanute, KS	2.45
Augusta, GA	3.06	Tallahassee, FL	2.28
Jackson, MS	3.02	San Diego, CA (NZY)	2.17
Atlanta, GA	3.00	Beaufort, SC	2.11
San Diego, CA (SAN)	2.97	Macon, GA (MCN)	2.09
McClellan AFB, CA	2.80	Scottsbluff, NE	2.06
Columbus, GA (CSG)	2.76	Macon/Robins AFB, GA (WRB)	2.05
Mather AFB, CA	2.73	San Diego, CA (NKX)	2.00

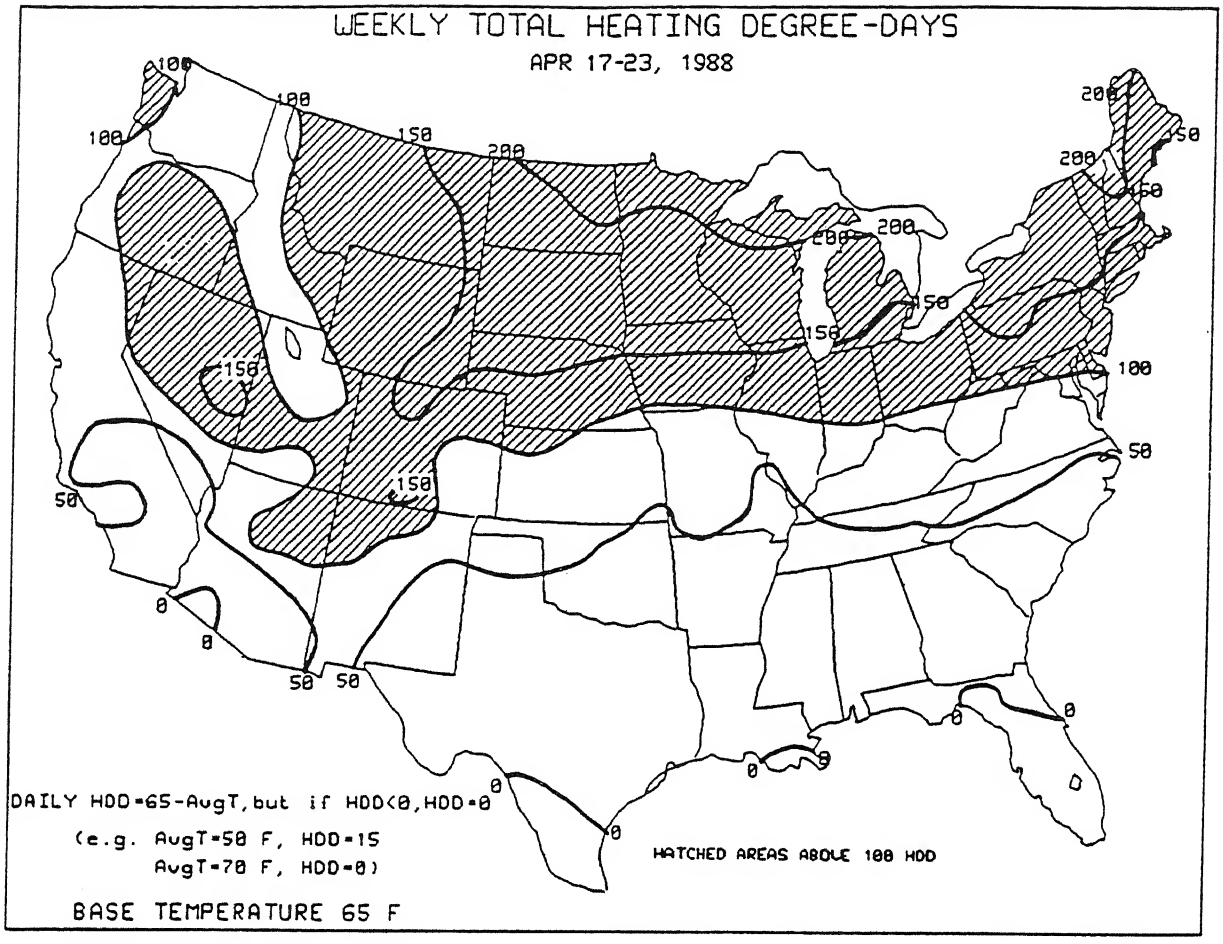
TABLE 2. Selected stations with temperatures averaging greater than 5°F ABOVE normal for the week.

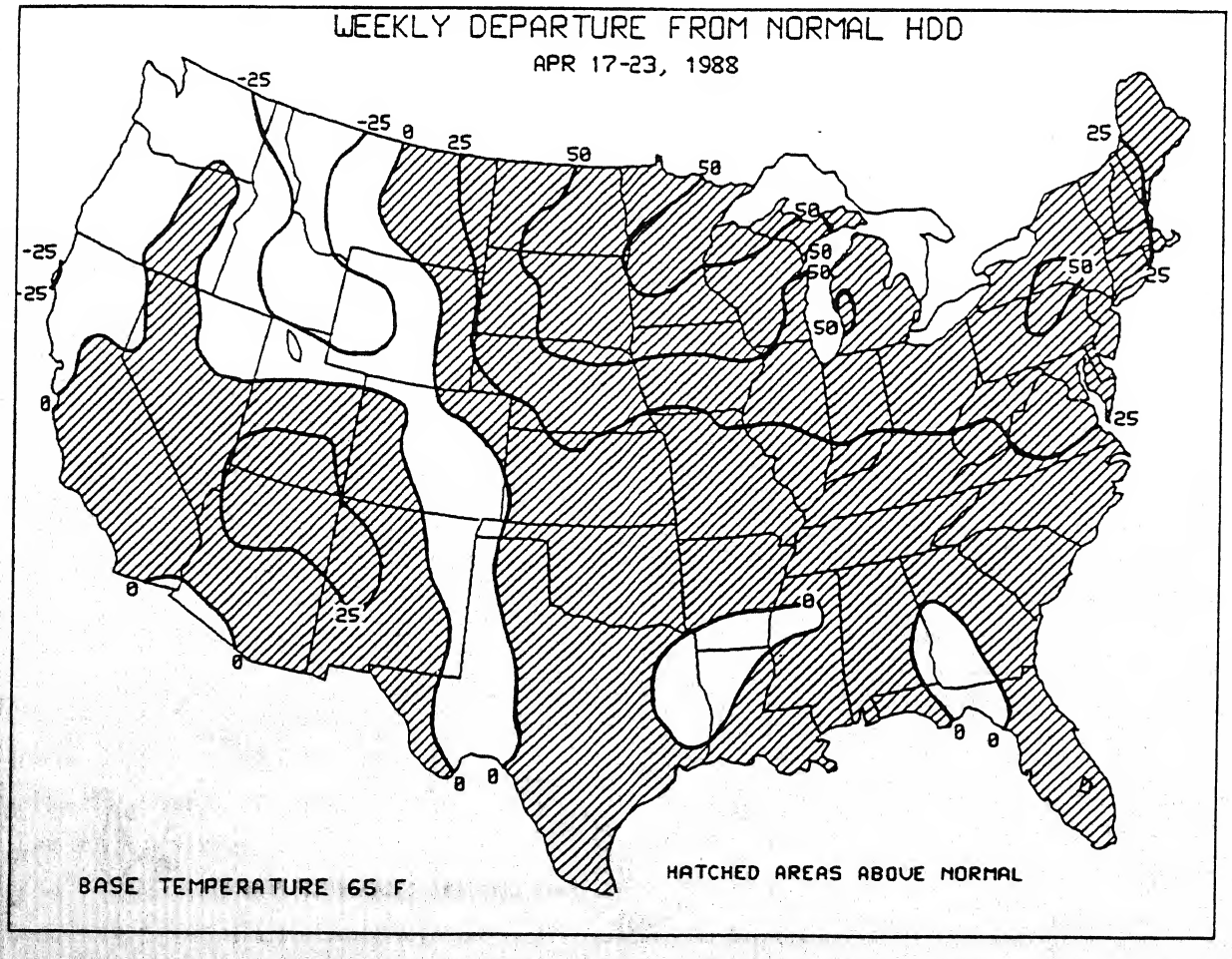
Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Barter Island, AK	+19	22	Unalakleet, AK	+ 9	34
Barrow, AK	+18	20	Fairbanks, AK	+ 7	41
Wainwright, AK	+17	22	Omak, WA	+ 7	57
Kotzebue, AK	+15	31	Big Delta, AK	+ 6	41
Bettles, AK	+12	38	Kalispell, MT	+ 6	51
Nome, AK	+10	31			

TABLE 3. Selected stations with temperatures averaging greater than 8°F BELOW normal for the week.

Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Warroad, MN	-11	31	Grand Forks, ND	- 9	35
Rochester, MN	-10	37	Aberdeen, SD	- 9	38
Fargo, ND	-10	36	Huron, SD	- 9	40
Pickstown, SD	-10	41	Sioux Falls, SD	- 9	41
Spencer, IA	- 9	40	La Crosse, WI	- 9	41
Mt. Washington, NH	- 9	16	Madison, WI	- 9	40
Bismarck, ND	- 9	37	Park Falls, WI	- 9	35
Devil's Lake, ND	- 9	34			

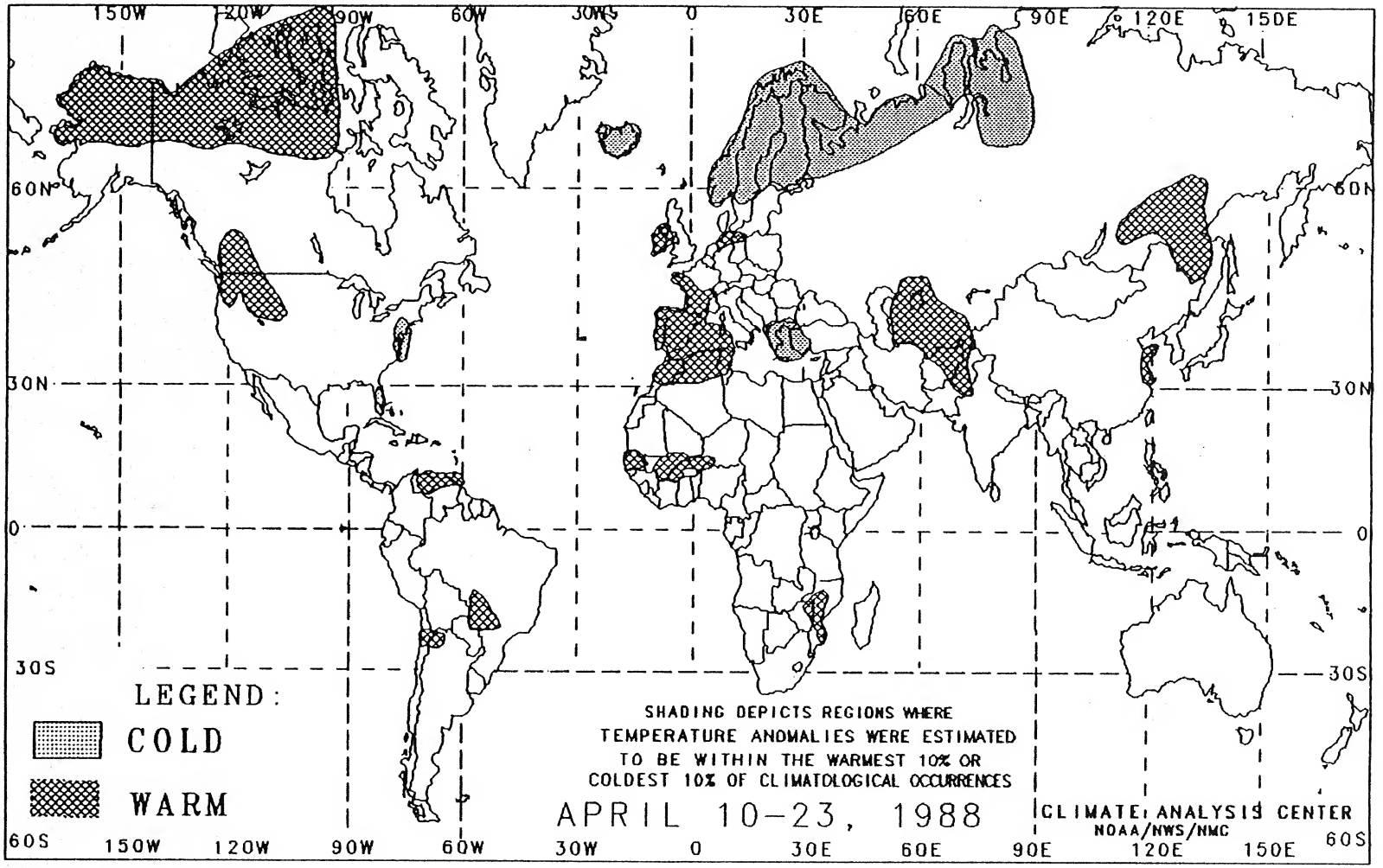



WEEKLY TOTAL HEATING DEGREE-DAYS
APR 17-23, 1988
DAILY HDD=65-AvgT, but if HDD<0, HDD=0
(e.g. AvgT=50 F, HDD=15
AvgT=70 F, HDD=0)
BASE TEMPERATURE 65 F
HATCHED AREAS ABOVE 100 HDD


WEEKLY DEPARTURE FROM NORMAL HDD
APR 17-23, 1988
BASE TEMPERATURE 65 F
HATCHED AREAS ABOVE NORMAL

GLOBAL TEMPERATURE ANOMALIES

2 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

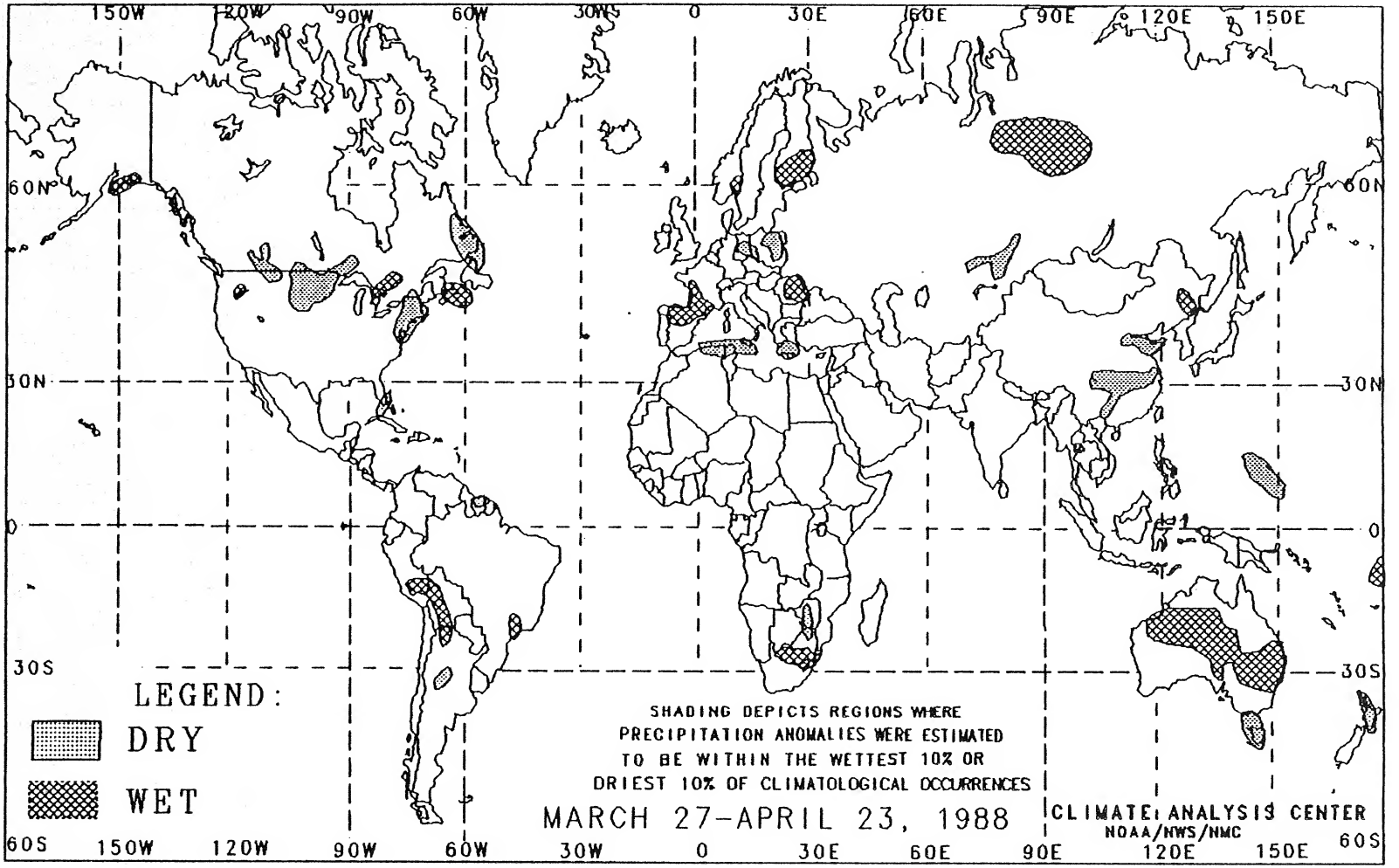
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining precentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC
National Weather Service, NOAA

THE INDIAN MONSOON SEASON OF 1987

The Indian summer monsoon season, typically considered to occur from June through September, provides the majority of the annual precipitation for the Indian subcontinent. Normally, the monsoon spreads rather rapidly across India during June, starting in the Southeast, and covers the entire country by the end of the month (see Figure 1).

Early in 1987, concern was raised over the monsoon circulation as advisories on the El Nino/Southern Oscillation (ENSO) were being issued. This was due to the strong association between relatively poor monsoons (below normal rainfall) and warm episodes of the ENSO which have been observed over the past century.

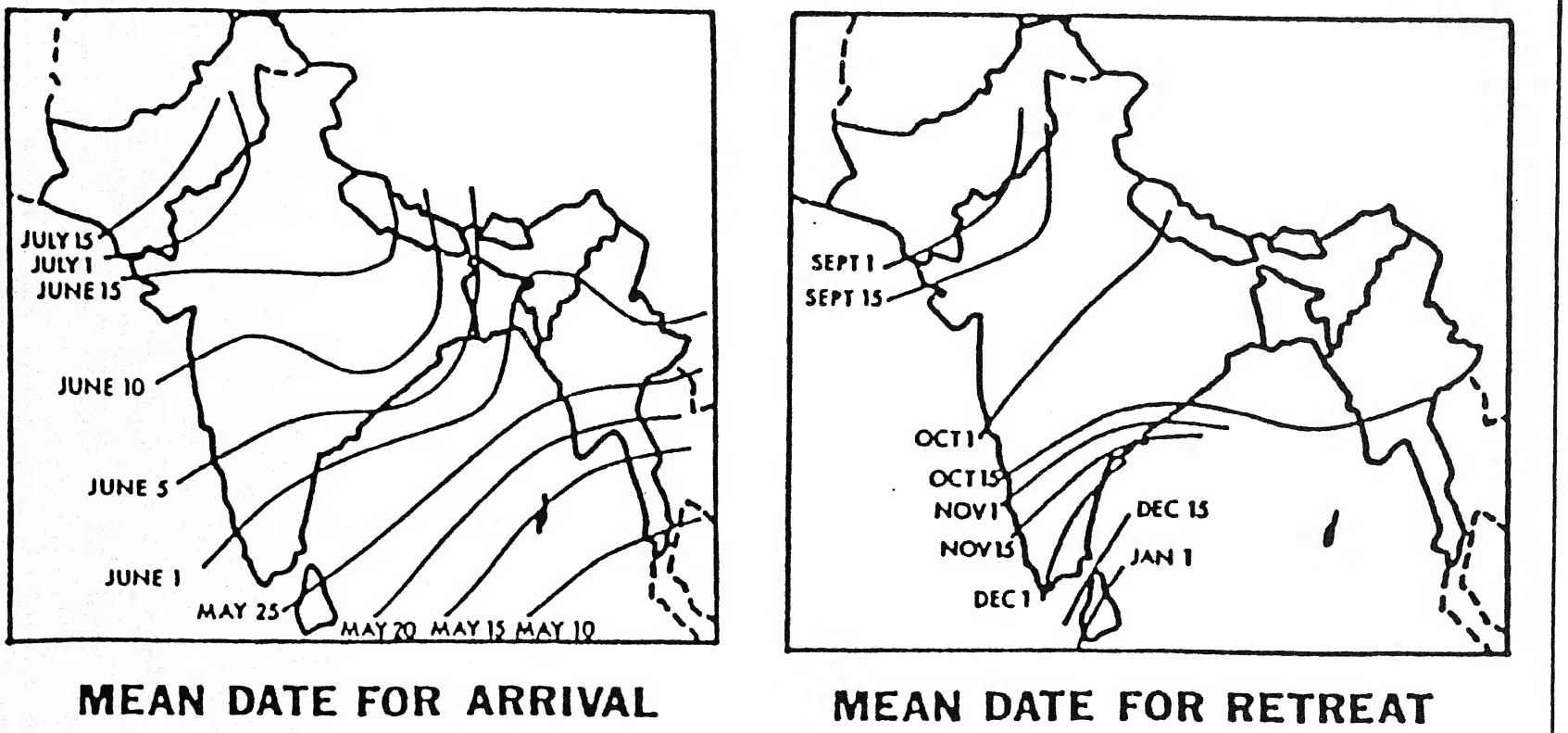


FIGURE 1. The mean dates of the southwest monsoon's arrival and retreat.

The first indications of a delayed monsoon season were the presence of unusually late extratropical storms in northwestern India and Pakistan during May as wet (260-840% of normal May precipitation) and cold (May temperatures 2-5°C below normal) conditions prevailed in the region. By the end of June, Gujarat state had received only 10-20% of normal rainfall for the month and there were indications the monsoon would fail. By late August, large areas of northwestern and north-central India had reported less than half the normal amount of rain since June 1 and some locations recorded only 20-30% of normal. Pockets of dryness also existed in southern India. Furthermore, unusually warm weather, with temperatures 2-4°C above normal, exacerbated the dry conditions in northwestern India. Dryness developed in Andhra Pradesh state (southeastern India) by the end of September, suggesting an early end to the monsoon. Another indication was noted when extratropical storms appeared early in the autumn season as extreme northern Indian precipitation was 200-500% of normal during October.

Overall, the 1987 monsoon precipitation, summarized from June through September, was less than 75% of normal across northwestern, western, east-central, and southern India and most of Pakistan (see Figures 2, 3, and front cover). Above normal rainfall, with some flooding according to press reports, fell across parts of northeastern India, Nepal, Bhutan, and northern Bangladesh.

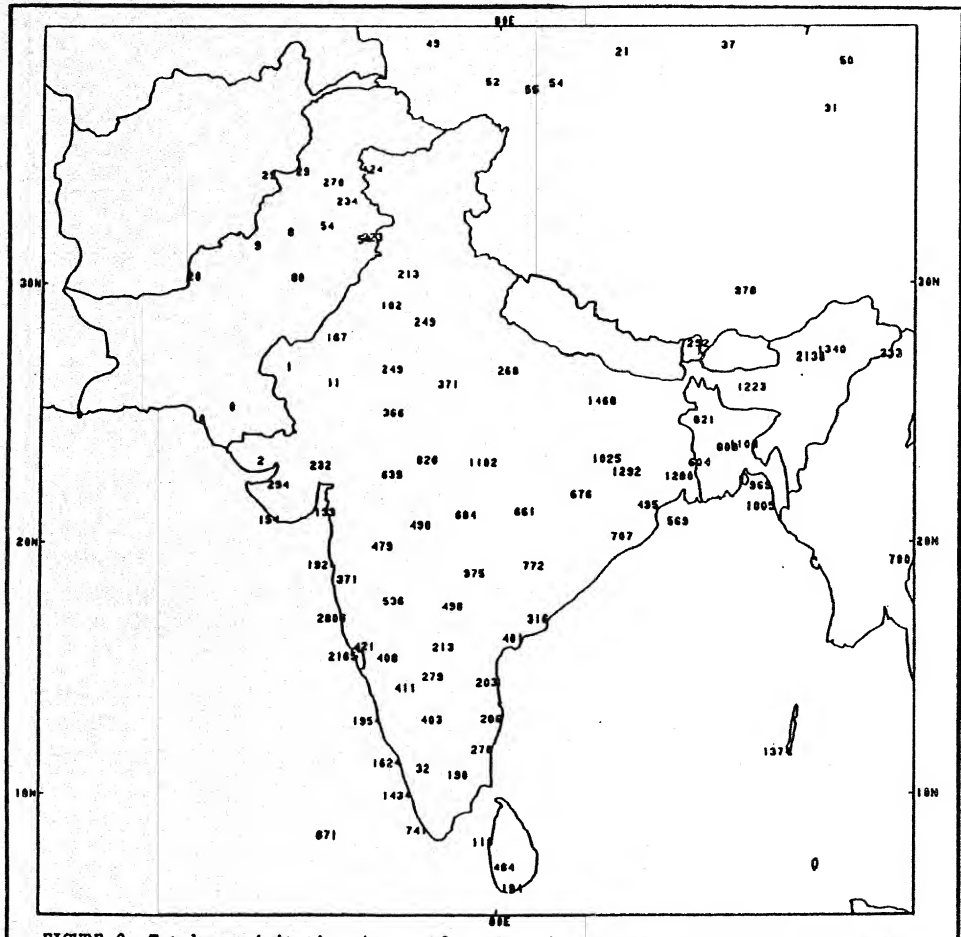


FIGURE 2. Total precipitation in mm. from June 1 - September 30, 1987 (122 days). Stations need a minimum of 110 days (90%) or more for inclusion. Largest totals were located along India's western coast, from the central state of Madhya Pradesh eastward into Bihar and West Bengal states, in northern Bangladesh, and in the northeastern Indian state of Assam.

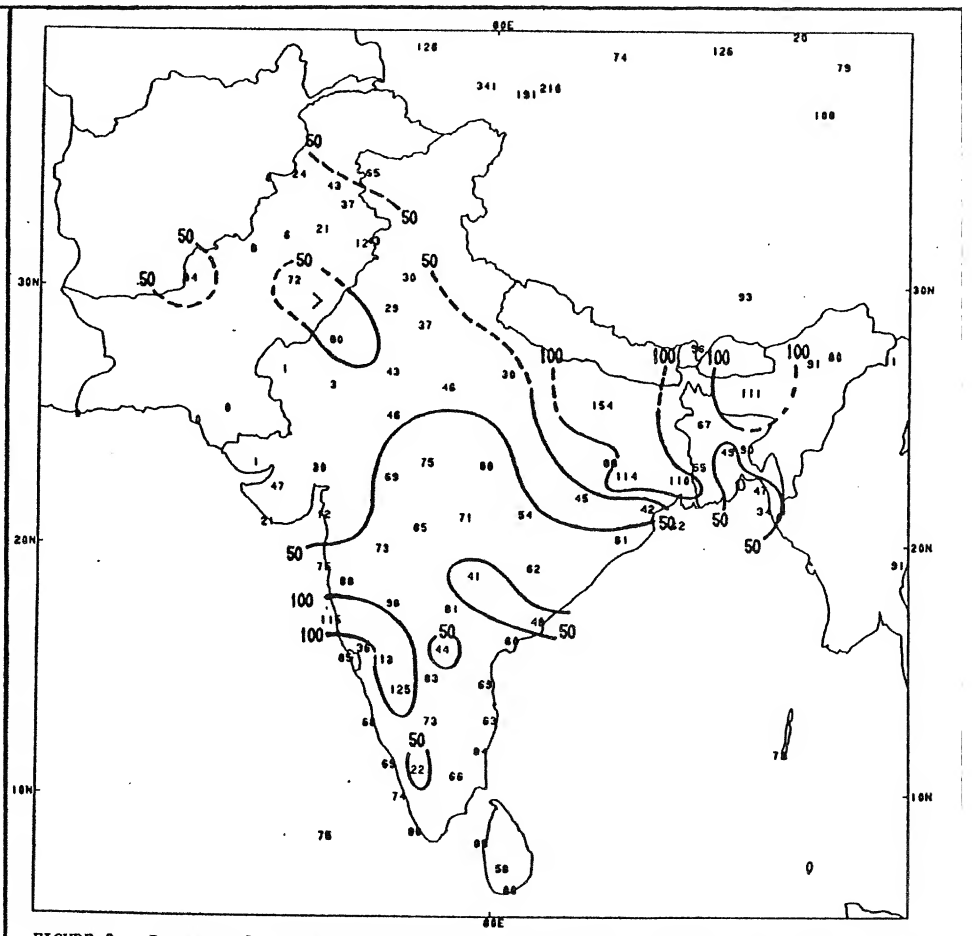


FIGURE 3. Percent of normal precipitation from June 1 - September 30, 1987. From the available stations, most of India and Pakistan were well-below normal for the season. Only parts of southwestern India (northern Mysore and western Maharashtra states), northern Bangladesh, and northeastern India (eastern Uttar Pradesh, Bihar, West Bengal, and Assam states) measured near to above normal monsoon rains.

The normal monthly rainfall totals for the region during the monsoon season are depicted for June (Figure 4), July (Figure 5), August (Figure 6), and September (Figure 7). The large fluctuations in normal rainfall values over the spring, summer, and autumn months are most noticeable in northwestern India and along the western coastal regions.

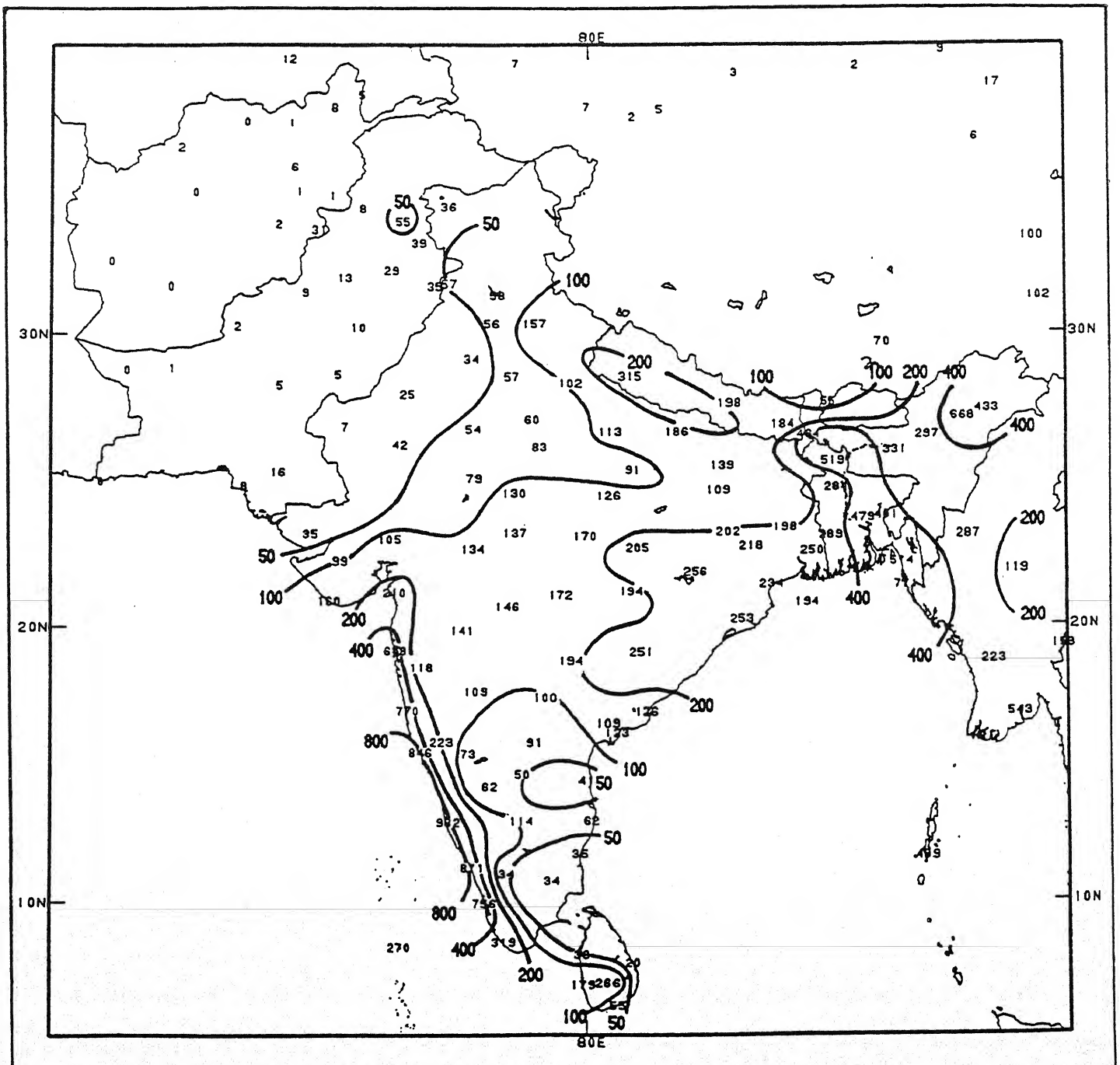


FIGURE 4. June normal precipitation (mm). Totals rapidly increase by next month in central India.

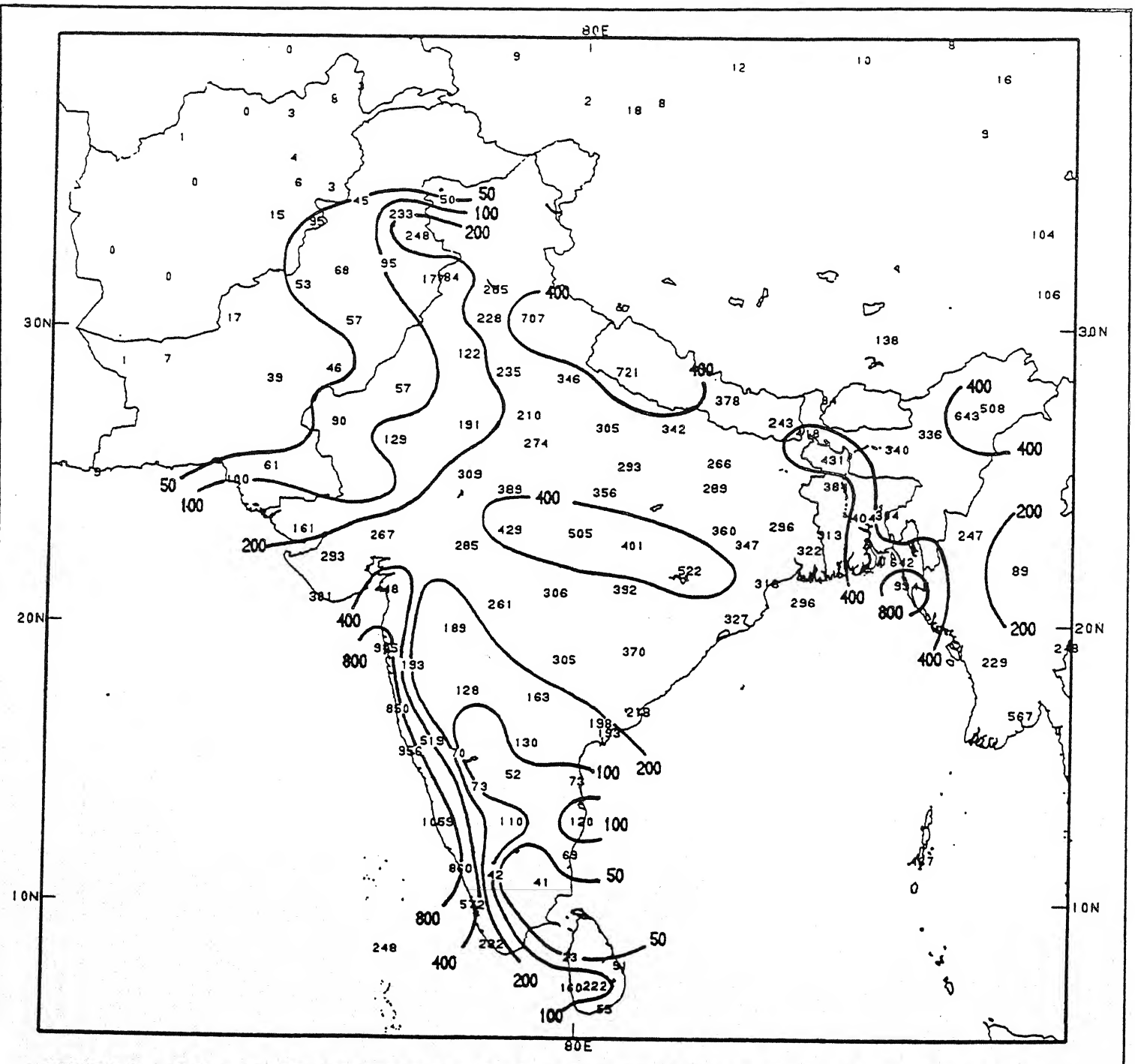


FIGURE 5. July normal precipitation (mm). Greatest monsoon amounts normally occur during this month or next in northwestern and western sections of India and eastern Pakistan.

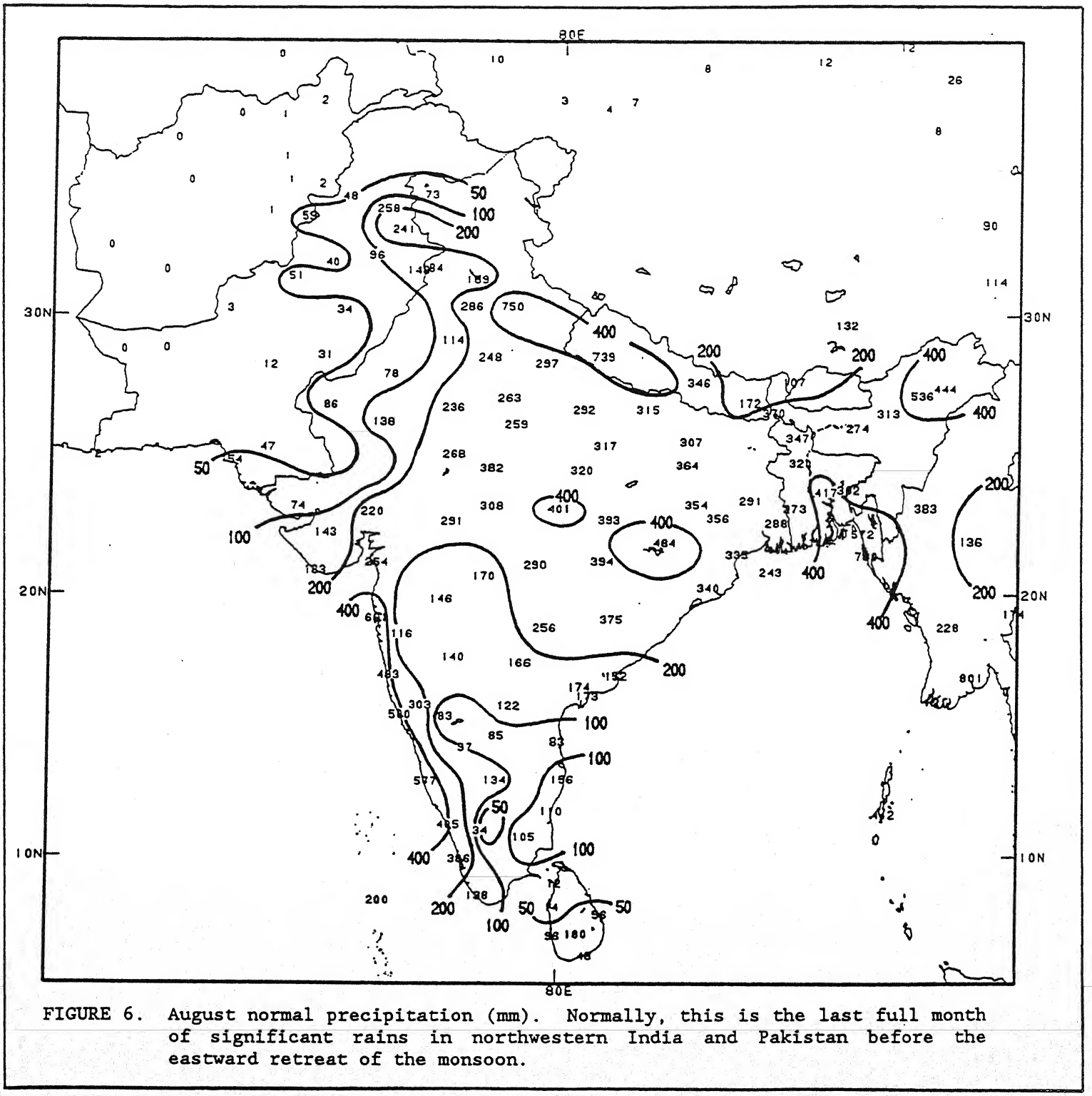


FIGURE 6. August normal precipitation (mm). Normally, this is the last full month of significant rains in northwestern India and Pakistan before the eastward retreat of the monsoon.

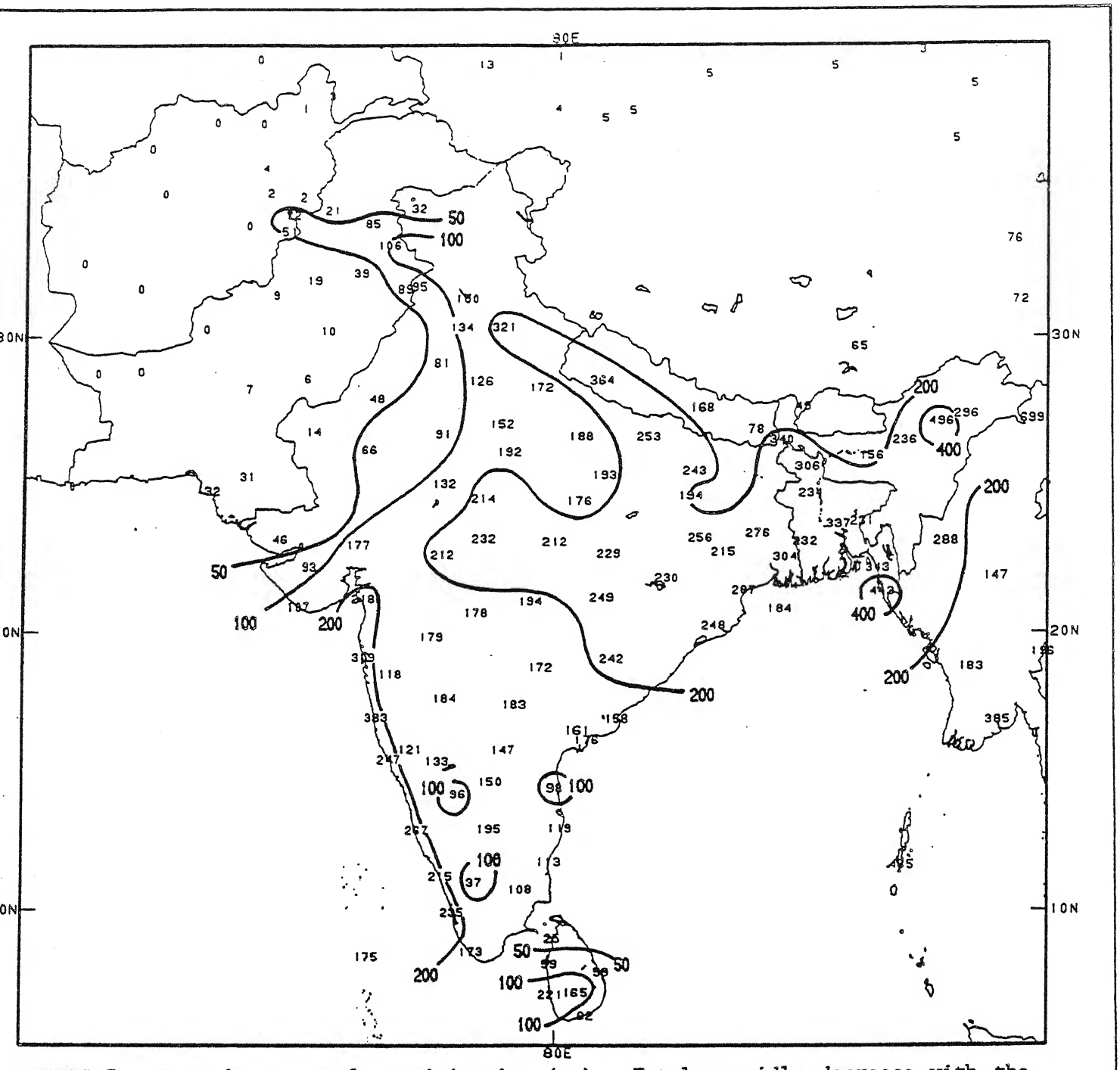


FIGURE 7. September normal precipitation (mm). Totals rapidly decrease with the withdrawal of the monsoon rains.